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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/021,566

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Douglas G. Hunter

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03/11/2003

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EXAMINER

BELENA, JOHN F

ART UNIT

PAPER NUMBER

3746

DATE MAILED: 03/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/021,566

Applicant(s)

HUNTER ET AL.

Examiner

John F. Belena, Ph.D.

Art Unit

3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28 and 29 is/are allowed.
- 6) ☒ Claim(s) 1-7, 9, 10, 15, 16, 18, 21-24, 27 and 30-32 is/are rejected.
- 7) ☒ Claim(s) 8, 11-14, 17, 19, 20, 25 and 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:



United States Patent & Trademark Office

DETAILED ACTION

SPECIFICATION

1. The abstract of the disclosure is objected to because page 31, line 3, "ABSTRACT" should read --**ABSTRACT OF THE DISCLOSURE**--.

Correction is required. See MPEP § 608.01(b).

2. The disclosure is objected to because of the following minor informality: page 14, line 21, "portion 86" should read --portion 68--.

Appropriate correction is required.

3. The title of the invention is not completely descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: --VARIABLE DISPLACEMENT
VANE PUMP WITH VARIABLE TARGET REGULATOR VALVE--.

DRAWINGS

4. The drawings are objected to because in Figure 2, the leader line from reference numeral (26) needs to terminate in the chamber *not* the eccentric ring (20), the leader line from reference numeral (50) needs to be extended and *not* terminate on the eccentric ring inner surface and three profile lines are missing *within* the eccentric ring volume. Please see *Attachment A* at the end of this office action where Figure 2 is shown with red ink corrections. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

CLAIM OBJECTIONS

5. **Claims 1, 27, 28, 30 & 32** are objected to because of the following informality: line 5, "pivotably" should read --pivotally--. Appropriate correction is required.
6. **Claim 6** is objected to because of the following informality: line 2, "yieldably" should read --in yielding--. Appropriate correction is required.
7. **Claim 15** is objected to because of the following informality: line 2, "of the rotor" should read --on the rotor--. Appropriate correction is required.

CLAIM REJECTIONS - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. **Claims 1, 2, 3, 6, 10, 15 & 32** are rejected under 35 U.S.C. 102(b) as being anticipated by (5,545,014) to Sundberg et al.

Sundberg et al., Figures 1-8, disclose a variable displacement vane pump (11), comprising: a housing {(19), (20)} defining a chamber, a pump inlet (36) through which fluid enters the housing {(19), (20)} and a pump outlet (25) through which fluid is discharged from the housing (19) under pressure; a containment ring or eccentric ring (14) pivotally (34) carried by the housing (20) for movement between a first position and a second position and defining an opening {not reference signed} with an internal surface (14a); a rotor (12) carried by the housing {(19), (20)} for rotation

relative to the internal surface (14a) and to having a plurality of slots {(31), (33)} extending inwardly into the rotor (12) from an exterior of the rotor; a plurality of vanes (13) carried by the rotor with each vane slidably received in a slot {(31), (33)} in the rotor (12); a first actuator {See Figs. 2 & 3 right-hand piston touching (44)} responsive to application of fluid under pressure and operable to pivot the containment ring or eccentric ring (14) in a first direction; and a second actuator {See Figs. 2 & 3 left-hand piston touching (44)} responsive to application of fluid under pressure and operable to pivot the containment ring or eccentric ring (14) in a second direction. The first actuator {See Figs. 2 & 3 right-hand piston touching (44)} is a piston slidably carried by the body (20) and responsive to a first actuation pressure signal and the said second direction {See Figs. 2 & 3 at (44)} is in a direction opposite of the first direction. The first actuator {See Figs. 2 & 3 right-hand piston touching (44)} includes a spring {not reference signed} that in yielding biases the containment ring or eccentric ring (14) in said first direction. The pump (11) comprises a pivot pin (34) about which the containment ring or eccentric ring (14) pivots, said pivot pin (34) defining a pivot axis of the containment ring or eccentric ring (14) which is

offset from the axis of the rotor by about one-half the maximum eccentricity of the containment ring or eccentric ring (14) relative to the rotor (12). The slots (33) in the rotor (12) extend radially inwardly on the rotor (12). The said first and second actuators are fluid acting directly (44) on said containment ring (14). See Sundberg et al., Figures 1-8, and respective portions, abstract, col. 5 lines 10-67, col. 6 lines 1-67, col. 7 lines 1-67, col. 8 lines 1-62, of the detailed description.

10. **Claims 1, 2, 3, 7, 15, 18 & 32** are rejected under 35 U.S.C. 102(b) as being anticipated by (5,545,018) to Sundberg.

Sundberg, Figures 1-3, disclose a variable displacement vane pump (11), comprising: a housing (20) defining a chamber, a pump inlet {not reference signed} through which fluid enters the housing (20) and a pump outlet {not reference signed} through which fluid is discharged from the housing (20) under pressure; a containment ring or eccentric ring (14) pivotally (18) carried by the housing (20) for movement between a first position and a second position and defining an opening {not reference signed} with an internal surface (14a); a rotor (12) carried by the housing

(20) for rotation relative to the internal surface (14a) and to having a plurality of slots (17) extending inwardly into the rotor (12) from an exterior of the rotor; a plurality of vanes (13) carried by the rotor with each vane slidably received in a slot (17) in the rotor (12); a first actuator {See Fig. 2 right-hand piston touching (44)} responsive to application of fluid under pressure and operable to pivot the containment ring or eccentric ring (14) in a first direction; and a second actuator {See Fig. 2 left-hand piston touching (44)} responsive to application of fluid under pressure and operable to pivot the containment ring or eccentric ring (14) in a second direction. The first actuator {See Fig. 2 right-hand piston touching (44)} is a piston slidably carried by the body (20) and responsive to a first actuation pressure signal and the said second direction {See Fig. 2 at (44)} is in a direction opposite of the first direction. The pump (11) also comprises a seal {(33), (34)} between the containment ring or eccentric ring (14) and the housing defining a fluid chamber between the housing {(15), (16), (20)} and containment ring or eccentric ring (14) with fluid under pressure in the fluid chamber defining the first actuator. The slots (17) in the rotor (12) extend radially inwardly on the rotor (12). The seal {(33), (34)} is carried on

the housing {(15), (16), (20)}. The said first and second actuators are fluid acting directly {on the stem handle} on said containment ring (14). See Sundberg, Figures 1-3, and respective portions, abstract, col. 3 lines 60-67, col. 4 lines 1-67, col. 5 lines 1-56, of the detailed description.

11. **Claims 1, 2, 3, 15, 22, 23, 24 & 32** are rejected under 35 U.S.C. 102(b) as being anticipated by (3,918,855) to Bornholdt.

Bornholdt, Figure 1, discloses a variable displacement vane pump, comprising: a housing (1) defining a chamber, a pump inlet {not reference signed in (1)} through which fluid enters the housing and a pump outlet {not reference signed in (1)} through which fluid is discharged from the housing under pressure; a containment ring or eccentric ring (6) pivotally (18) carried by the housing (1) for movement between a first position and a second position and defining an opening {not reference signed} with an internal surface (6a); a rotor (2) carried by the housing (1) for rotation relative to the internal surface (6a) and to having a plurality of slots (4) extending inwardly into the rotor (2) from an exterior of the rotor; a plurality of vanes (5) carried by the rotor (2) with each vane (5) slidably

received in a slot (4) in the rotor; a first actuator {(7) or (8)} responsive to application of fluid under pressure and operable to pivot (18) the containment ring or eccentric ring (6) in a first direction; and a second actuator {(8) or (7)} responsive to application of fluid under pressure and operable to pivot the containment ring or eccentric ring (6) in a second direction. The first actuator {(7) or (8)} is a piston slidably carried by the body and responsive to a first actuation pressure signal. The said second direction is in a direction opposite of the first direction. The slots (4) in the rotor (2) extend radially inwardly on the rotor (2). The vanes (5) have leading and trailing faces and the slots (4) in the rotor (2) are slightly wider than the vanes (5) {vanes slide in slots – not an interference fit} so that a fluid film forms {especially after vane wear} between the rotor (2) and the leading and trailing faces of each vane (5). Especially after vane (5) wear against slot (4) a fluid seal is formed by contact between the vane (5) and rotor (2). The said first and second actuators {(7) & (8)} are fluidly acting directly on said containment ring (14). See Bornholdt, Figure 1, and respective portions, abstract, col. 3 lines 30-68, col. 4 lines 1-68, col. 5 lines 1-34, of the detailed description.

12. **Claims 1, 2, 3, 15 & 32** are rejected under 35 U.S.C. 102(b) as being anticipated by (DE 3446603A1) to W. Berg et al.

W. Berg et al., Figure 1, discloses a variable displacement vane pump (10), comprising: a housing (11) defining a chamber (12), a pump inlet (24) through which fluid enters the housing and a pump outlet (28) through which fluid is discharged from the housing (11) under pressure; a containment ring or eccentric ring (20) pivotally (21) carried by the housing 1(1) for movement between a first position and a second position and defining an opening {possibly not reference signed} with an internal surface (19); a rotor (13) carried by the housing (11) for rotation relative to the internal surface (19) and to having a plurality of slots (17) extending inwardly into the rotor (13) from an exterior of the rotor; a plurality of vanes (16) carried by the rotor (13) with each vane (16) slidably received in a slot (17) in the rotor; a first actuator {(32) or (36)} responsive to application of fluid under pressure and operable to pivot (21) the containment ring or eccentric ring (20) in a first direction; and a second actuator {(36) or (32)} responsive to application of fluid under pressure and

operable to pivot the containment ring or eccentric ring (20) in a second direction. The first actuator {(32) or (36)} is a piston slidably carried by the body and responsive to a first actuation pressure signal. The said second direction is in a direction opposite of the first direction. The slots (17) in the rotor (13) extend radially inwardly on the rotor (13). The said first and second actuators {(32) & (36)} are fluidly acting directly on said containment ring (20). See W. Berg et al., Figure 1.

13. **Claims 1, 2, 3, 15, 22, 23, 24 & 32** are rejected under 35 U.S.C. 102(b) as being anticipated by (4,222,718) to Lemke.

Lemke, Figures 1-5, discloses a variable displacement vane pump, comprising: a housing (10) defining a chamber (24), a pump inlet {not shown} through which fluid enters the housing and a pump outlet {not shown} through which fluid is discharged from the housing (10) under pressure; a containment ring or eccentric ring (20) pivotally {at (8)} carried by the housing (10) for movement between a first position and a second position and defining an opening {not reference signed} with an internal surface (19); a rotor (13) carried by the housing (11) for rotation relative to

the internal surface {not reference signed} and to having a plurality of slots (16) extending inwardly into the rotor (14) from an exterior of the rotor; a plurality of vanes (18) carried by the rotor (14) with each vane (18) slidably received in a slot (16) in the rotor; a first actuator {(26) or (38)} responsive to application of fluid under pressure and operable to pivot {at (8)} the containment ring or eccentric ring (20) in a first direction; and a second actuator {(38) or (26)} responsive to application of fluid under pressure and operable to pivot the containment ring or eccentric ring (20) in a second direction. The first actuator {(26) or (38)} is a piston slidably carried by the body and responsive to a first actuation pressure signal. The said second direction is in a direction opposite of the first direction. The slots (16) in the rotor (14) extend radially inwardly on the rotor (14). The vanes (18) have leading and trailing faces and the slots (16) in the rotor (14) are slightly wider than the vanes (18) {vanes slide in slots – not an interference fit} so that a fluid film forms {especially after vane wear} between the rotor (14) and the leading and trailing faces of each vane (18). Especially after vane (18) wear against slot (16) a fluid seal is formed by contact between the vane (18) and rotor (14). The said first and second actuators {(26) & (38)}

are fluidly acting directly on said containment ring (20). See Lemke, Figures 1-5, and respective portions, abstract, col. 3 lines 30-68, col. 4 lines 1-45, of the detailed description.

14. **Claims 1, 2, 3, 15 & 32** are rejected under 35 U.S.C. 102(b) as being anticipated by (5,398,505) to Oogushi et al.

Oogushi et al., Figure 1, discloses a variable displacement vane pump (11), comprising: a housing (15) defining a chamber {inside (18)}, a pump inlet {(24) connected to (13)} through which fluid enters the housing and a pump outlet {(25) connected to (14)} through which fluid is discharged from the housing (11) under pressure; a containment ring or eccentric ring (18) pivotally {at (20)} carried by the housing (11) for movement between a first position and a second position and defining an opening {not reference signed} with an internal surface; a rotor (17) carried by the housing (11) for rotation relative to the internal surface {not reference signed} and to having a plurality of slots {not reference signed} extending inwardly into the rotor (17) from an exterior of the rotor (17); a plurality of vanes {not reference signed} carried by the rotor (17) with each vane slidably received in a slot

{not reference signed} an actuator {(22) or (21)} responsive to application of fluid under pressure and operable to pivot {at (20)} the containment ring or eccentric ring (18) in a first direction; and a second actuator {(21) or (22)} responsive to application of fluid under pressure and operable to pivot the containment ring or eccentric ring (18) in a second direction. The first actuator {(21) or (22)} is a piston slidably carried by the body and responsive to a first actuation pressure signal. The said second direction is in a direction opposite of the first direction. The slots {not referenced signed} in the rotor (17) extend radially inwardly on the rotor (17). The said first and second actuators {(21) & (22)} are fluidly acting {(22) directly and (21) in reaction} directly on said containment ring (18). See Oogushi et al., Figure 1, and respective portions, abstract, col. 2 lines 5-63, of the detailed description.

15. Claims 1-6, 10, 15 & 32 are rejected under 35 U.S.C. 102(b) as being anticipated by (5,141,418) to Ohtaki et al.

Ohtaki et al., Figures 1-7, disclose a variable displacement vane pump (10), comprising: a housing {(11a), (11b)} defining a chamber (24), a pump

inlet {not reference signed} through which fluid enters the housing {(11a), (11b)} and a pump outlet (40) through which fluid is discharged from the housing (11) under pressure; a containment ring or eccentric ring (20) pivotally (23) carried by the housing (11) for movement between a first position and a second position and defining an opening {not reference signed} with an internal surface (21); a rotor (14) carried by the housing {(11a), (11b)} for rotation relative to the internal surface (21) and to having a plurality of slots {(16), (17)} extending inwardly into the rotor (14) from an exterior of the rotor; a plurality of vanes (15) carried by the rotor (14) with each vane slidably received in a slot {(16), (17)} in the rotor (14); a first actuator {Right-hand piston (33) touching (22)} responsive to application of fluid under pressure and operable to pivot the containment ring or eccentric ring (20) in a first direction; and a second actuator {Left-hand piston (37) touching (22)} responsive to application of fluid under pressure and operable to pivot the containment ring or eccentric ring (20) in a second direction. The first actuator {Right-hand piston (33) touching (22)} is a piston slidably carried by the body (11) and responsive to a first actuation pressure signal and the said second direction {See (22)} is in a

direction opposite of the first direction. The second actuator is a piston (37) slidably carried by the body (11) and responsive to a second actuation pressure signal. The first actuator {Right-hand piston (33) touching (22)} includes a spring (34) that in yielding biases the containment ring or eccentric ring (22) in said first direction. The pump (11) comprises a pivot pin (23) about which the containment ring or eccentric ring (20) pivots, said pivot pin (23) defining a pivot axis of the containment ring or eccentric ring (20) which is offset from the axis of the rotor by about one-half the maximum eccentricity of the containment ring or eccentric ring (20) relative to the rotor (14). The slots in the rotor {(16), (17)} extend radially inwardly on the rotor (14). The said first and second actuators are fluid acting directly (22) on said containment ring {(20), (22)}. See Ohtaki et al, Figures 1-7, and respective portions, abstract, col. 2 lines 35-68, cols. 3 & 4 lines 1-68, of the detailed description.

CLAIM REJECTIONS - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. **Claims 9, 21, 27, 30 & 31** are rejected under 35 U.S.C. 103(a) as being unpatentable over (5,141,418) to Ohtaki et al. as applied to claims 1-6, 10, 15 & 32 above, and further in view of (4,468,173) to Dantlgraber.

As set forth above in the rejection of claims 1-6, 10, 15 & 32 above, Ohtaki et al. discloses the invention substantially as claimed. Ohtaki et al. does not disclose a control valve or actuator nor a control circuit responsive to engine conditions.

Dantlgraber, Figures 1-3, discloses a pressure control valve (8) responsive to a first pilot pressure {via (19)} to control application of said first fluid pressure to said first actuator (4), and responsive to a second pilot pressure {via (7) & (16)} to control application of said second fluid

pressure to said second actuator (5). Dantlgraber also discloses a control circuit that can be responsive to engine conditions {Load (3)} for providing a variable targeting of pump output {abstract – low and high pressure ranges of a variable displacement pump} wherein pressure from the oil circuit in the engine {Load (3)} acts on the first actuator (4) and pressure from the outlet acts {via (6)} on the second actuator (5) for variable control of the eccentric ring {in (1)} in response to these conditions. The pump comprises an exhaust {discharge} opening {connected to (2)}. See Dantlgraber, Figures 1-3, and respective portions, abstract, col. 2 lines 40-68, col. 3 lines 1-68, col. 4 lines 1-28, of the detailed description.

It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to make the pump (1) of Dantlgraber the pump (10) of Ohtaki et al. so as to use the pressure control valve and control circuit of Dantlgraber to drive oil for lubrication to an engine {Load (3)}.

18. **Claims 9, 21, 27, 30 & 31** are rejected under 35 U.S.C. 103(a) as being unpatentable over (5,141,418) to Ohtaki et al. as applied to claims 1-6, 10, 15

& 32 above under 35 USC 102 subheading, and further in view of (5,052,896) to Fischer et al.

As set forth above under 35 USC 102 subheading for the rejection of claims 1-6, 10, 15 & 32, Ohtaki et al. discloses the invention substantially as claimed. Ohtaki et al. does not disclose a control valve or actuator nor a control circuit responsive to engine conditions.

Fischer et al., sole Figure, discloses a pressure control valve (13) responsive to a first pilot pressure {via (33)} to control application of said first fluid pressure to said first actuator (4), and responsive to a second pilot pressure {via (12)} to control application of said second fluid pressure to said second actuator (3). Fisher et al. also discloses a control circuit that can be responsive to engine conditions {Load (45)} for providing a variable targeting of pump output {abstract - adjustment means for changing the output volume of fluid pump} wherein pressure from the oil circuit in the engine {Load (45)} acts on the first actuator (4) and pressure from the outlet acts {via (9)} on the second actuator (3) for variable control of the eccentric ring (2) in response to these conditions. The pump comprises an exhaust {discharge} opening {connected to (10)}. See Fischer et al., sole Figure, and

respective portions, abstract, col. 3 lines 15-68, cols. 4 & 5 lines 1-68, col. 6 lines 1-6, of the detailed description.

It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to make the pump (1) of Fischer et al. the pump (10) of Ohtaki et al. so as to use the pressure control valve and control circuit of Fischer et al. to drive oil for lubrication to an engine {Load (45)}.

****The claims were examined with the broadest reasonable interpretation of the claimed structural/functional subject matter. A proper and acceptable response to this office action requires addressing all issues/objections/rejections invoked in this office action.****

ALLOWABLE SUBJECT MATTER

19. Claims 8, 11-14, 17, 19, 20, 25 & 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
20. Claims 28 & 29 are allowed.

CONCLUSION

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following selected patents and technical literature is cited to further show the state of the art in vane pumps and related technology in general where the not all obvious salient features of the patents are disclosed as follows:

- ❖ US Patent No. 4,632,638 to Shibayama et al. discloses a vane pump with a pressure regulator valve and control circuit.
- ❖ US Patent No. 4,035,105 to Dantlgraber discloses a variable displacement vane pump with pump control valve.

❖ Japanese Patent No. JP02001173575A discloses a
variable displacement vane pump with pump control
valves and control circuit.

****Please review the above three patents when amending the current claims for they contain structural/functional material that read on the present claims.****

22. Any inquiry concerning this communication from the examiner should be directed to **John F. Belena, Ph.D.** whose telephone number is **(703) 305-3533**. The examiner can normally be reached on Monday through Thursday from 9:00 AM to 5:00 PM. The examiner can also be reached on alternate Fridays from 9:00 AM to 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the **examiner's supervisor, Timothy S. Thorpe**, can be reached on **(703) 308-0102**. The fax number for this Group Art Unit 3746 is **(703) 872-9302**. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed

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to the Group Art Unit 3746 receptionist whose telephone number is (703)
308-0861.



John E. Belena

GAU 3746
2/14/03

Charles G. Freay
CHARLES G. FREAY
PRIMARY EXAMINER